

**ABSTRACT**

Embodiments of the invention provide a system for temperature control of the human body. The system includes an indwelling catheter with a tip-mounted heat transfer element. The catheter is 5 fluidically coupled to a console that provides a heated or cooled heat transfer working fluid to exchange heat with the heat transfer element, thereby heating or cooling blood. The heated or cooled blood then heats or cools the patient's body or a selected portion thereof. In particular, methods and devices, including software, 10 are provided for administering cooling or rewarming and controlling the same based on a projected control temperature measured by a temperature sensor within the catheter.